

REMARKS

Claims 1, 7, and 8 are rejected in the Office Action. Claim 1 has been amended with this reply, and “new” claim 27 is offered. Upon entry of the Amendments, claims 1, 7, 8 and 27 remain pending.

Support for the Amendment to claim 1 is found in the specification as originally filed, for example at page 7, lines 10-13 of the specification. Support for new claim 27 is found in original claim 1 and at page 7-26. Applicants respectfully request entry of the Amendments.

REJECTION UNDER 35 U.S.C. § 112

Claims 1, 7, and 8 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. The Office Action states that the phrase “an electro-conductive polymer absorbing aromatic molecules” is vague and indefinite. Applicants have amended the phrase in question to make clear that the electro-conductive limitation refers to the polymer and not the aromatic molecules. Applicants believe the amendment to claim 1 suffices to remove the alleged indefiniteness of claim 1. Accordingly, Applicants respectfully request the rejection be withdrawn.

Claims 1, 7, and 8 are also rejected under 35 U.S.C. § 112, first paragraph as not being supported by an enabling specification. The Office Action states that the specification is enabling for solutions used in the dispensing step having a surface tension of 35 dyne/cm or above, but is not enabling for dispensing any solution. Further, the Office Action states the specification is not enabling for any print head because a special “solvent resistant” print head is said to be essential to the method. Applicants respectfully traverse the rejection to the amended claims and request reconsideration.

A specification is enabling to support claims if the specification conveys to a person of skill in the art the ability to carry out the invention as claimed without undue experimentation. Teachings of the prior art are assumed to be within the possession of skill in the art. It is not necessary to include what is known in a specification to make the specification enabling to a person of skill in art. These principals will be applied to the surface tension and print head issues below.

The specification enables the use of solutions having a surface tension below 35 dyne/cm¹. Specifically at page 7, lines 17-26, the specification describes making a tetrahydepuran solution of a film forming material and ink jet printing it onto microelectrodes. CHF is an organic solvent having a surface tension of approximately 26.4 dyne/cm, as indicated at Table 2, page 549 of the Lemmo reference cited in the Office Action. Thus, at page 7, the specification enables a person of skill in the art to use a solution having a surface tension of about 26 dyne/cm, which is significantly below the putative 35 dyne/cm limit cited in the Office Action.

Although the Calvert reference opines that the minimum surface tension for ink jet printing is about 35 dyne/cm, Applicants respectfully point out that other teachings of the prior art indicate that successful ink jet inks, for example, may be made having surface tensions less than 35 dyne/cm. Attention is respectfully drawn to Table 1 of published U.S. Application 2003/0005856, attached for convenience to this Office Action reply. In Table 1, ink jet ink No. 5 has a surface tension of 31.4 dyne/cm and shows superior performance in the drying test after being ink jet printed. There a person skill in the art is charged with knowledge of all the teachings of the prior art. Although the Calvert reference could be taken as indicating that ink jet printing is not possible with solutions having a surface tension below 35 dyne/cm, that teaching

¹ The unit "35 dyne/cm" is used equivalently for the unit "mM.m-1" used in the Office Action.

is countermanded by numerous other teachings of the prior art of successful ink jet printing at lower surface tension. In addition the specification itself gives an example of printing with a solution of approximately 26 dyne/cm. On the basis of the teachings of the prior art and the enabling examples given in the current specification, Applicants respectfully submit that the specification is enabling for solutions without respect to a surface tension limitation of 35 dyne/cm.

The specification also enables a person of skill in the art to carry out the invention as claimed with respect to any special print heads allegedly required to carry out the invention. Evidence of the knowledge of the person of skill in the art in this area is given in the Office Action itself and in the Calvert reference at page 3300, cited under factors 3 and 5 of the in re Wands factors. Specifically, the Office Action states the Calvert reference teaches that printing the solutions of conducting polymers required a special solvent resistant print head. Applicants respectfully submit the cited passage from the reference shows that persons of skill in the art are in possession of both the requirement for solvent resistant print heads, and their availability. As noted above, it is not necessary to include in a specification knowledge that is already in possession of those of skill in the art. Because the prior art indicates the knowledge of special solvent heads, Applicants respectfully submit their specification is enabling for their use.

The in re Wands factors will now be addressed in turn.

(1-2) Breadth of the claims and nature of the invention: Claim 1 has been amended to recite the use of specific film forming materials and electro-conductive polymers. The physical characteristics of such solutions may be readily determined by a person of skill in the art. Specifically, solutions may be made having appropriate viscosity and surface tension using the

teaching of the specification. Applicants respectfully submit that as applied to the amended claims, this one factor favors a finding of enablement.

(3 and 5) The state of the prior art and the level of predictability in the art:

As discussed above, the prior art teaches that ink jet printing can be carried out using solutions of a wide variety of surface tensions including surface tensions below 35 dyne/cm. Based on those teachings, a person of skill in the art would tend to discount such statements such as in the Calvert reference that solutions must have a surface tension of 35 dyne/cm or greater to be useful. The skilled person would be guided by other teachings in the art such as U.S. Patent Application 2003/0005856 that teach solutions having lower surface tensions may also be successfully ink jet printed. Applicants respectfully submit that consideration of this Wands factor also favors a holding of enablement.

(4) The level of one of ordinary skill:

As stated in the Office Action, the level of ordinary skill is high, probably at the PhD level. Such highly skilled persons would be able to distinguish and decide among conflicting teachings in the art, such as those represented by the Calvert reference and the U.S. Patent Application. Applicants respectfully submit that this Wands factor also favors a holding of enablement with respect to the amended claim.

(6-7) The amount of direction provided by the inventor and the existence of working examples:

As discussed above, Applicants provide at page 7 of the specification an Example of making a solution having a surface tension of approximately 26.4 dyne/cm, based on the surface

tension of the solvent, tetrahydrofuran. The specification is definitely enabling for ink jet printing solutions having surface tensions below 35 dyne/cm. Applicants respectfully submit that consideration of this Wands factor also favors the finding of enablement with respect to the amended claims.

(8) The quantity of experimentation needed to make or use the invention based on the content of the disclosure:

For the reasons discussed above, Applicants respectfully submit that a person of skill in the art to use the invention as claimed with solutions having surface tension above 35 dyne/cm as well as having surface tension below 35 dyne/cm. Experimentation is not needed because the specification gives an exactly working example. As to the print head, Applicants have shown above that the necessity for and existence of suitable solvent print heads was well within the possession of those of skill in the art. For this reason, undue experimentation would not be necessary to carry out the invention as claimed. Applicants respectfully submit that consideration of this Wands factor also favors a finding of enablement with respect to the amended claims.

On the basis of the discussion above, Applicants respectfully submit that this specification is enabling for the full scope of the amended claims. Accordingly, Applicants respectfully request that the enablement rejection under 35 U.S.C. § 112 first paragraph be withdrawn.

REJECTION UNDER 35 U.S.C. § 103

Claims 1, 7 and 8 are rejected under 35 U.S.C. 103(a) as unpatentable over the Sangodkar reference in view of the Lemmo reference and the Newman reference. Applicants respectfully traverse the rejection as applied to the amended claims and request reconsideration. Applicants have amended claim 1 to reflect that the electro-conductive polymer is selected from the group consisting of polypyrrole, polymethylpyrrole, polythiothene, polymethylthiothene, and polyphenylene vinylene. Applicants respectfully submit that such electro-conductive polymers are neither nor suggested by the combined references. Accordingly request that the rejection as applied to the amended claims be withdrawn.

New Claim 27

New claim 27 has been added to further define and claim the invention. Claim 27 recites the step of printing a solution of thin filmed material through an ink jet nozzle onto the surfaces of microelectrodes such that an organic thin film is formed on the microelectrode. In claim 27, the solution to be printed onto the microelectrodes contains a thin film material and a solvent. Upon deposition by ink jet printing, the thin film material forms an electro-conductive polymer selected from the group consisting of polypyrrole, polymethylpyrrole, polythiothene, polymethylthiothene, and polyphenylene vinylene.

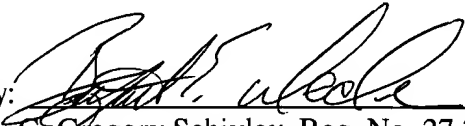
Claim 27, which is supported in the steps, for example, at page 7 as discussed above, is patentable over the art of record for at least those reasons discussed above. Accordingly, Applicants respectfully request claim 27 be advanced to a state of allowance.

CONCLUSION

For the reasons discussed above, Applicants believe claim 1, 7, 8, and 27 as amended are in a state of allowance, and respectfully request an early notice of such allowance. The Examiner is invited to telephone the undersigned if that would be helpful to resolving any issues.

Respectfully submitted,

Dated: May 17, 2004

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